

REMARKS

Claims 1, 3, 7, 8 and 14-22 are pending in this application. Claims 7 and 8 are currently withdrawn from consideration. By this Amendment, claim 1 is amended to recite that the diamond fine particles comprise carboxyl and/or sulfo group on the surface thereof, and that the amine substance is reacted with the carboxyl and/or sulfo group to form a salt. Claim 7 is similarly amended for rejoinder purposes. Support for the amendments to claims 1 and 7 may be found in the original specification at, for example, page 4, lines 6-16, page 6, lines 11-16 and page 7, lines 9-12. Claims 20-22 are added. Support for new claim 20 may be found in the original specification at, for example, page 4, lines 6-16, page 6, lines 11-16 and page 7, lines 9-12. Support for new claim 21 may be found throughout the original specification including at, for example, page 4, line 22 to page 5, line 1. Support for new claim 22 may be found in the original specification at, for example, page 5, lines 2-8. No new matter is added by this Amendment.

In view of the foregoing amendments and following remarks, reconsideration of this application is respectfully requested.

I. Obviousness-Type Double Patenting Rejection

Claims 1, 3 and 14-17 were provisionally rejected for obviousness-type double patenting over claims 1-7 of copending Application No. 12/458,634. This rejection is respectfully traversed as being improper and contrary to law.

Claims 1-7 in Application No. 12/458,634 are directed to (1) a low dielectric constant film and (2) an electronic component comprising the low dielectric constant film. Application No. 12/458,634 was filed as a divisional application of the present application following a Restriction Requirement in the present application that restricted claims directed to (1) a low dielectric constant film and (2) an electronic component comprising the low dielectric constant film (i.e., restricted claims directed to the subject matter claimed in the

divisional application). See the October 8, 2008 Office Action in the present application in which the Restriction Requirement is summarized, and in which the claims of the divisional application were summarized as Groups II and III. These claims were not elected in the present application, and instead were canceled and submitted for examination in the divisional Application No. 12/458,634.

As explained in MPEP 804.01, double patenting rejections are prohibited by law (35 U.S.C. §121) where the Patent Office requires restriction and an applicant files a divisional application to seek patent protection for the restricted claims. This is because the Patent Office cannot restrict claims on the basis that the claims are independent and distinct and then later allege that the claims are in fact not patentably distinct and thus rejectable for double patenting.

In view of the foregoing, Applicants submit that the obviousness-type double patenting rejection is improper and must be withdrawn. Reconsideration and withdrawal of the rejection are thus respectfully requested.

II. Rejections Under 35 U.S.C. §103(a)

A. Claims 1, 3 And 14-17

Claims 1, 3 and 14-17 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent Application Publication No. 2004/0040217 (Takashina) in view of U.S. Patent No. 5,690,539 (Swidler), in view of Pyridine Safety Data, and in view of U.S. Patent No. 6,337,060 (Hiraki). This rejection is respectfully traversed.

Claim 1 is directed to a liquid composition comprising diamond fine particles purified and oxidized by heating with a purifying agent, the diamond fine particles comprising carboxyl group and/or sulfo group on a surface thereof, a dispersant, and an amine substance having a boiling point of 50°C or higher and 300°C or lower, the amine substance being reacted with the carboxyl group and/or sulfo group to form a salt. As explained in the present

specification, the inventors found that the gelling of purified and oxidized diamond dispersion can be prevented, and thus a low and stable viscosity maintained, by forming a salt of an amine substance with carboxyl and/or sulfo groups on the surface of the diamond fine particles. See, for example, page 4, lines 6-21, page 6, lines 11-16 and page 7, lines 4-16 of the specification. This advantageous effect is confirmed by the results of the Examples and Comparative Examples in the specification, where Examples 1 and 2 demonstrate that liquid compositions of the present application are able to maintain a low viscosity without gelling after one month (Example 1) and several days (Example 2), whereas liquid compositions of Comparative Examples 1-3 gelled and/or precipitated after only a few days.

While the inventors do not know the exact mechanism for preventing gellation, it is speculated that through salt formation with the amine substance and the carboxyl and/or sulfo groups on the surface of the diamond fine particles, a protective moiety is formed that prevents aggregation of the diamond fine particles that would otherwise occur.

Applicants respectfully submit that one of ordinary skill in the art would not have been led to the presently claimed liquid composition or advantageous features associated therewith from the teachings of Takashina, Swidler, Pyridine Safety Data, and Hiraki.

Takashina describes a polishing composition comprising an aqueous medium and abrasive particles, wherein the abrasive particles have a specified size distribution. See the Abstract. At paragraphs [0035] to [0037], Takashina describes several materials that may be used as the abrasive particles in the polishing composition. Among the long list of materials is mentioned diamond. At paragraphs [0048] to [0055], Takashina describes that the polishing composition is an aqueous composition that may optionally include a long list of various additives, including a pH adjusting agent, a dispersion stabilizer, an oxidizing agent, a chelating agent, a preservative and the like. As the pH adjusting agent, Takashina describes, among other agents, water-soluble organic amines. See paragraph [0051].

The Patent Office recognizes that Takashina does not describe or suggest the use of diamond fine particles purified and oxidized by heating with a purifying agent as required in claim 1, but alleged that the use of such diamond fine particles would have been obvious from Hiraki. Applicants respectfully disagree.

Hiraki describes a process of boiling diamond particles in a sulfuric acid solution in order to remove contaminants that coexist with the diamond, and in order to form carboxyl or hydroxyl groups on the diamond. See the Abstract and col. 3, lines 50-61. The Patent Office alleged that it would have been obvious to have used Hiraki's purified and oxidized diamond particles in Takashina in order to obtain a stable dispersion of diamond particles. Applicants disagree.

First, Applicants respectfully submit that claim 1 requires a liquid composition in which diamond fine particles have carboxyl and/or sulfo groups on the surface thereof, and in which the amine substance of the composition forms a salt with the carboxyl and/or sulfo groups. Only through the use of improper hindsight would one of ordinary skill in the art found claim 1 obvious. This is because one of ordinary skill in the art would have had to have selected diamond from the large list of abrasive particles in Takashina, then would have had to further selected to use an organic amine as an optional pH adjusting agent from among the large list of possible optional pH adjusting agents in Takashina, and then finally would have had to have used the treated diamond particles of Hiraki in order to have potentially fortuitously discovered that carboxyl and/or sulfo groups on the surface of the diamond fine particles form a salt with the amine substance. Neither Takashina nor Hiraki direct one to have made the needed selections in the absence of hindsight.

Instead, one of ordinary skill in the art would not have been led to have combined Takashina and Hiraki as alleged by the Patent Office with any reasonable expectation of success. In this regard, the Patent Office alleged that one would have combined the

references in order to obtain a stable dispersion of diamond particles. However, Hiraki describes that the diamond particles therein are stable in acidic solutions having a pH of 4.0. See col. 3, lines 12-17 and lines 61-63, as well as Example 1, col. 5, lines 11-14. Hiraki does not describe stability otherwise. Because Hiraki describes stability in an acidic medium, one following Hiraki would not have been led to have included a basic amine pH adjusting agent in Takashina, and thus combining the teachings would not have led one to the liquid composition of claim 1.

Further, one of ordinary skill in the art understood that Hiraki's treated diamond particles still exhibited significant aggregation issues when dispersed in a liquid medium. The Patent Office is respectfully directed to Fig. 6 of JP-A 2002-289604 (attached), which has previously been made of record, showing the microstructure of a diamond film formed from a dispersion of water and diamond micrograins purified with sulfuric acid without adding an amine substance. Clearly, the hydrophilic diamond micrograins aggregated to each other to form considerably larger secondary particles (black image), with porous parts interconnected with each other like a ceramic material (white image), meaning that the diamond micrograins are aggregated due to the stronger attraction of the hydrophilic diamond micrograins. One thus would not have found it obvious to have used Hiraki's diamond particles in Takashina with any reasonable expectation of success.

Finally, nothing in either Takashina or Hiraki describes or suggests the salt formation between an amine substance and the carboxyl and/or sulfo groups on the surface of diamond fine particles, or the unexpected advantages associated therewith, as detailed in the present application. One of ordinary skill in the art would not have found the liquid composition of claim 1 obvious for this additional reason.

The Patent Office turned to the teachings of Swidler and Pyridine Safety Data as allegedly suggesting the use of pyridine as the pH adjusting agent in Takashina's polishing

composition. Applicants respectfully submit that neither Swidler nor the Pyridine Safety Data remedy any of the deficiencies of Takashina and Hiraki discussed above.

For all the foregoing reasons, reconsideration and withdrawal of the rejection are respectfully requested.

B. Claims 18 And 19

Claims 18 and 19 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Takashina in view of Swidler, in view of Pyridine Safety Data, and in view of Hiraki, and still further in view of U.S. Patent No. 6,143,794 (Chaudhuri). This rejection is respectfully traversed.

The Patent Office further turned to the teachings of Chaudhuri as allegedly suggesting the use of diethanolamine as the pH adjusting agent in Takashina's polishing composition. Applicants respectfully submit that the further teachings of Chaudhuri fail to remedy any of the deficiencies of Takashina and Hiraki discussed extensively above.

For all the foregoing reasons, reconsideration and withdrawal of the rejection are respectfully requested.

III. Rejoinder

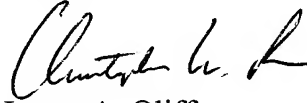
Upon allowance of claims 1, 3 and 14-22, Applicants respectfully submit that claims 7 and 8 should be rejoined with the application and similarly allowed.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 3, 7, 8 and 14-22 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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